Dam ID: HI00005
Mana Reservoir

Vulnerability Index:
Extreme 1 | High 2 | Moderate 3 | Low 4

Inspection No:
Date: 3/23/2006

STATE OF HAWAII - DLNR
VISUAL DAM SAFETY INSPECTION SHEET

Inspection Type: Dam Safety Inspection

Persons Present	Affiliation	Phone Number
Henri Mulder	USACE	
Alan Silva	DLNR - DOFAW	
Eric Yuasa	DLNR - Engineering Division	

Weather Condition: X Rain previous day ☐ Rainy ☐ Drizzle / Mist X Cloudy/Overcast ☐ Partly Cloudy ☐ Sunny ☐ Dry

Comments:

1. General: *(Information currently on file, update as required)*

Dam/Res. Name: Mana Reservoir
Owner: State of Hawaii
Owner Contact: Land Division — Owner Ph.:
Lessee: — Lessee Ph.:
O & M Contractor: — O & M Ph.:
Nearest City: Kekaha — Latitude: ° (decimal)
County: — Longitude: ° (decimal)
Tax Map Key(s):

Dam Status	Active	Hazard Potential	Low	Dam Size	25'
Year Completed	1905	Dam Length	1,600 ft.	Dam Height	15 ft.
Normal Storage	135 ac.ft.	Max. Storage	135 ac.ft.	Max. Surface Area	ac.
Offsite Drainage Area	mi.	Spillway Type		Max. Spillway Q	cfs

Owner owns land under dam facility: Yes
Emergency Action Plan on file with the Department: None
Reports on file with the Department:

Met with Mike Tombio - Irrigation Manager for Sunrise Co.
Supervisor Landis Ignacio

2. Questions for Owner's Rep.:	Yes	No	Unknown	Comments
Construction Plans Available	☐	☐	☐	
Site / Facility Map	☐	☐	☐	
Operation & Maintenance Manual	☐	☐	☐	
Emergency Action Plan	☐	☐	☐	
Modifications / Improvements	☐	☐	☐	
Conduct Routine Inspections	☐	☐	☐	
Conduct Routine Maintenance	☐	☐	☐	
Vehicle access to site	X	☐	☐	☐ Not accessible X With Standard car ☐ Requires 4-Wheel Drive
Access during heavy rains	X	☐	☐	☐ Not accessible X With Standard car ☐ Requires 4-Wheel Drive
Access when spillway is flowing	X	☐	☐	☐ Not accessible X With Standard car ☐ Requires 4-Wheel Drive
Other Studies Conducted	☐	☐	☐	☐ Phase I ☐ Phase II ☐ Hydraulics ☐ Stability ☐ Hazard ☐ Seismic ☐ Other:
Incident History	☐	☐	☐	☐ Breached ☐ Overtop ☐ Slide ☐ Down stream Flooding ☐ Other:
Reservoir's Current Use	☐	☐	☐	☐ Sediment ☐ Irrigation ☐ Recreation ☐ Flood Control ☐ Drinking Water ☐ Power Generation ☐ Other:

Findings and Corrective Actions:

- ☐ a. The Owner shall maintain documentations including Construction plans, specifications, improvements, modifications, Operations and Maintenance Manuals and routine inspection logs for this dam facility.
- ☐ b. An Emergency Action Plan (EAP) is on file with the department, submit any updates as applicable.
- ☐ c. An EAP is required for High Hazard Dams. Submit an updated EAP for this facility.
- ☐ d. An EAP is recommended for all dams regardless of hazard class. Submit EAP if developed for the facility.
- ☐ e. Submit narrative and additional information detailing the improvements, modifications, and/or alterations at the dam site, unless covered by approved dam permit.
- ☐ f. Routine inspection logs were not inspected.
- ☐ g. Dam owners shall provide for routine inspection of the dam.
- ☐ h. The dam did not appear to be maintained on a regular basis.
- ☐ i. Access to site appears to be satisfactory.
- ☐ j. There is no vehicular access to the dam site. Operational and emergency plans need to reflect this deficiency or access provided.
- ☐ k. Access to dam is questionable during severe weather conditions and/or spillway overflows. Operational plans and emergency plans need to reflect this deficiency or access provided.
- ☐ l. Provide a detailed narrative of the incident, responses taken, and any damages incurred. Dam owners are required to promptly advise the department of any sudden or unprecedented flood or unusual or alarming circumstance or occurrences which may adversely affect the dam or reservoir.
- ☐ m. Submit current Operations and Maintenance Manual or Procedures for this dam / reservoir facility.
- ☐ n. Submit Site or Facility Map of this Dam which identifies the location of major features including outlet works controls and conduits.
- ☐ o. _____

Additional Requirements:

The following investigative study(s) are:

Required	Recommended	
☐	☐	Phase I Study
☐	☐	Phase II Study (Including ☐ Seepage ☐ Hydrology/Hydraulics ☐ EAP)
☐	☐	Hydrology and Hydraulics (including Probable Maximum Flood and spillway capacity)
☐	☐	Stability Analysis
☐	☐	Seismic Analysis
☐	☐	Hazard Classification
☐	☐	Other: _____

Physical Dam Features: (Check All Applicable. Provide description of Items Observed and/or Take Photos. Indicate photo # in description.)

3. Reservoir:

Level during inspection _____ ft per _____ (gage / other)

Normal Operating Level/Range _____ ft per _____ (gage / other)

Description: Higher than normal pool elevation; 2 ½ to 3' free board

Typical Operation ☐ Spillway always flowing ☐ Kept within normal range ☐ Kept Empty ☐ Drained Daily ☐ Only filled by Storms

X Other: Higher than normal

Sinkhole in Res.: ☐ # Observed: _____ Size: _____ by _____ in. Deep ☐ Not Visible X None Observed

Description: _____

Staff Gage: Description: Yes, catwalk with staff gage and valve

Findings:

☐ a. The reservoir was not inspected.
X b. The reservoir appeared to be in satisfactory condition, no corrective actions are required at this time.
☐ c. The reservoir appeared to be in fair to poor condition and requires corrective action.
☐ d. The reservoir appeared to be in unsatisfactory condition, urgent corrective action is required.

Corrective Actions:

☐ e. The staff gage needs maintenance and/or repair. Description: _____
☐ f. A staff gage was not observed at the reservoir. Provide some method of quantifying the water level within the reservoir.
☐ g. A sinkhole was observed in the upstream reservoir. Conduct additional investigations and monitoring to identify the cause, risk and appropriate action.
☐ h. _____

4. Intake Works Description:

X Number of Intakes 1

☐ Intake Culvert / Pipe

Size: _____ in. ☐ DIP ☐ Corrugated Metal ☐ PVC ☐ HDPE ☐ Concrete ☐ Other _____

Control: ☐ Gate ☐ Valve ☐ Flow can either be Shut off or Bypassed

From: ☐ Stream Diversion ☐ Pump ☐ Reservoir ☐ Other _____

X Ditch / Flume

Dimension: 2 ½' wide x 2' deep (Size x Depth) Shape rectangle

Surface: X Dirt ☐ Wood ☐ Concrete ☐ Lined w/ _____

Control: ☐ Gate ☐ Valve X Flow can either be Shut off or Bypassed

From: ☐ Stream Diversion ☐ Pump ☐ Reservoir X Other Main irrigation ditch

Findings:

☐ a. The intake works were not inspected.
☐ b. The intake works were not tested.
☐ c. The intake works appeared to be in satisfactory condition, no corrective actions are required at this time.
X d. The intake works appeared to be in fair to poor condition and requires corrective action.
☐ e. The intake works appeared to be in unsatisfactory condition, urgent corrective action is required.

Corrective Actions:

X f. The intake works needs maintenance and/or repair. Description: Remove vegetation and silt from ditch
☐ g. _____

5. Upstream Slope: **(Typical Slope: can't determine slope due to high reservoir level)**

Slope Protection: X None ☐ Dumped Rock ☐ Fitted Rip Rap ☐ Grouted Rip Rap ☐ Liner _____ ☐ Other: _____

☐ Defect in Protection: Description: _____

Erosion: X Loose soil w/ little vegetation ☐ Rut (<6") ☐ Gully (>6" deep) ☐ Not Visible ☐ None Observed

Description: benching of slope due to wave erosion

Cracks: ☐ Parallel with crest ☐ Perpendicular to crest ☐ Slide visible X Not Visible ☐ None Observed

Description: slopes overgrown with buffalo grass - unable to inspect entire slope

Sinkholes: ☐ # Observed: _____ Size: _____ and _____ Depth X Not Visible ☐None Observed

Description: slopes overgrown with buffalo grass - unable to inspect entire slope

Vegetation: ☐ None ☐ Low Ground Cover X Bushes or Tall Grass X Trees # lots ☐ <6" X >6" & <20" ☐ >20"

Description: multiple mature plum trees

Findings:

☐ a. The upstream slope was not inspected.

☐ b. The upstream slope appeared to be in satisfactory condition, no corrective actions are required at this time.

X c. The upstream slope appeared to be in fair to poor condition and requires corrective action.

☐ d. The upstream slope appeared to be in unsatisfactory condition and not expected to fulfill its intended function. Urgent corrective action is required.

Corrective Actions:

☐ e. Slope protection needs maintenance or repair. Description: _____

X f. Rut and/or Gully erosion was observed on the slope, which requires maintenance and/or repair. Description: benching of slope due to wave action; should repair erosion and consider placing stone protection.

☐ g. A crack was observed on the slope, which requires further investigation to determine the underlining cause. Monitor the area and/or repair as required.

☐ h. A sinkhole was observed on the slope, which requires further investigation to determine the underlining cause. Repair and monitor the area.

☐ i. The upstream slope was not visible due to high grass and bush vegetation. Clear high vegetation and maintain low to enable easy visual inspection.

☐ j. Tree(s) were observed on the dam embankment. Trees have been identified as the probably cause of piping failures, and can possibly cause sever damage to the embankment if they are uprooted during a high winds. Corrective action is required to remove the tree hazards from the dam. Acceptable remedies include removal of the tree and its root structure down to a 2" diameter and reconstructing the damaged embankment section. All repair work shall be accomplished as per the requirements of licensed geotechnical or structural engineer. Routinely monitor the damaged area for signs of settlement and seepage.

X k. remove vegetation and trees from slope

6. Crest: Approximate Crest Width: 15' to 20'

Access: ☐ None X Walking Path ☐ Roadway, Surface / Width / Usage: _____

Erosion: ☐ Loose soil w/ little vegetation ☐ Rut (<6") ☐ Gully (>6" deep) X Not Visible ☐ None Observed

Description: unable to inspect entire crest due to heavy vegetation

Cracks: ☐ Parallel with crest ☐ Perpendicular to crest ☐ Slide visible X Not Visible ☐ None Observed

Description: see note above

Sinkholes: ☐ _____ in. Wide x _____ in. Long x _____ in. Deep X Not Visible ☐ None Observed

Description: see note above

Vegetation: ☐ None ☐ Low Ground Cover X Bushes or Tall Grass ☐ Trees #_____ ☐ <6" ☐ >6" & <20" ☐ >20"

Description: buffalo grass and haole koa

Findings:

☐ a. The dam crest was not inspected.

☐ b. The dam crest appeared to be in satisfactory condition, no corrective actions are required at this time.

X c. The dam crest appeared to be in fair to poor condition and requires corrective action.

☐ d. The dam crest appeared to be in unsatisfactory condition and not expected to fulfill its intended function. Urgent corrective action is required.

Corrective Actions:

☐ e. Access along the crest was satisfactory.

☐ f. Access along the crest was not possible. Description: _____

☐ g. Rut and/or Gully erosion was observed on the crest, which requires maintenance and/or repair. Description: _____

☐ h. A crack was observed on the crest, which requires further investigation to determine the underlining cause. Monitor the area and/or repair as required.

☐ i. A sinkhole was observed on the crest, which requires further investigation to determine the underlining cause. Repair and monitor the area.

X j. Portions of the crest were not visible due to high grass and bush vegetation. Clear high vegetation and maintain low to enable easy visual inspection.

☐ k. Tree(s) were observed along the dam crest. Trees have been identified as the probably cause of piping failures, and can possibly cause sever damage to the embankment if they are uprooted during a high winds. Corrective action is required to remove the tree hazards from the dam. Acceptable remedies include removal of the tree and its root structure down to a 2" diameter and reconstructing the damaged embankment section. All repair work shall be accomplished as per the requirements of licensed geotechnical or structural engineer. Routinely monitor the damaged area for signs of settlement and seepage.

☐ l. _____

7. Downstream Slope: **(Typical Slope ± 1 : 1 to 2)**

Access: X lower roadway along segment of toe ☐ roadway to outlet works ☐ walkway to outlet works ☐ None Observed

Slope Protection: X None ☐ Dumped Rock ☐ Rip Rap ☐ Grouted Rip Rap ☐ Concrete

Erosion: ☐ Loose soil w/ little vegetation ☐ Rut (<6") X Gully (>6" deep) ☐ Not Visible ☐ None Observed

Description: single location with broken 3" PVC pipe spraying water on embankment; Repairs to pipe are urgent

Cracks: ☐ Parallel with crest ☐ Perpendicular to crest ☐ Slide visible ☐ Not Visible X None Observed

Description: _____

Sinkholes: ☐ _____ in. Wide x _____ in. Long x _____ in. Deep ☐ Not Visible X None Observed

Description: _____

Vegetation: ☐ None ☐ Low Ground Cover X Bushes or Tall Grass X Trees # lots X <6" X >6" & <20" ☐ >20"

Description: _____

Seepage: Seep Spot Number 1

☐ Green Vegetation ☐ Wet or Muddy Ground ☐ Ponding Water X Not Visible X None Observed

☐ Flowing, Description: _____

Water Clarity: ☐ Clear ☐ Some particles ☐ Muddy ☐ Other: _____

Description: _____

Seep Spot Number 2

☐ Green Vegetation ☐ Wet or Muddy Ground ☐ Ponding Water ☐ Not Visible ☐ None Observed

☐ Flowing, Description: _____

Water Clarity: ☐ Clear ☐ Some particles ☐ Muddy ☐ Other: _____

Description: _____

Findings:

☐ a. The downstream slope was not inspected.

☐ b. The downstream slope appeared to be in satisfactory condition, no corrective actions are required at this time.

☐ c. The downstream slope appeared to be in fair to poor condition and requires corrective action.

X d. The downstream slope appeared to be in unsatisfactory condition and not expected to fulfill its intended function. Urgent corrective action is required. ***Urgent action is to repair the broken PVC pipe.***

Corrective Actions:

☐ e. Slope protection needs maintenance or repair. Description: _____

☐ f. Rut and/or Gully erosion was observed on the slope, which requires maintenance and/or repair. Description: _____

☐ g. A crack was observed on the slope, which requires further investigation to determine the underlining cause. Monitor the area and/or repair as required.

☐ h. A sinkhole was observed on the slope, which requires further investigation to determine the underlining cause. Repair and monitor the area.

X i. The down stream slope was not visible due to high grass and bush vegetation. Clear high vegetation and maintain low to enable easy visual inspection.

X g. Tree(s) were observed on the downstream slope. Trees have been identified as the probably cause of piping failures, and can possibly cause sever damage to the embankment if they are uprooted during a high winds. Corrective action is required to remove the tree hazards from the dam. Acceptable remedies include removal of the tree and its root structure down to a 2" diameter and reconstructing the damaged embankment section. All repair work shall be accomplished as per the requirements of licensed geotechnical or structural engineer. Routinely monitor the damaged area for signs of settlement and seepage.

☐ h. Seepage/Ponding water was observed. Monitor and conduct further investigation to locate the source of water and extent of any possible hazardous or developing condition.

☐ i. Seepage was observed flowing and particles were observed to be removed by the flow. Take immediate action to stop the loss of soil from the embankment. Conduct further investigation to determine the underlining cause and take corrective action. Monitor the area.

X j. The slope was very steep, around a 1 to 1 slope, further study is required to verify slope stability.

X k. Repair 3" PVC pipe. Repair should be done immediately. ***Urgent corrective action.***

8. Abutments/Toe:

Erosion: ☐ Loose soil w/ little vegetation ☐ Rut (<6") ☐ Gully (>6" deep) ☐ Not Visible X None Observed

Description: _____

Cracks: ☐ Parallel with crest ☐ Perpendicular to crest ☐ Slide visible ☐ Not Visible X None Observed

Description: _____

Vegetation: ☐ None ☐ Low Ground Cover X Bushes or Tall Grass ☐ Trees #_____ ☐ <6" ☐ >6" & <20" ☐ >20"

Description: buffalo grass and haole koa; vegetation in ditch that run along the toe

Seepage: Seep Spot Number 1

☐ Green Vegetation X Wet or Muddy Ground ☐ Ponding Water ☐ Not Visible ☐ None Observed

X Flowing, Description: less than 1 gpm

Water Clarity: X Clear ☐ Some particles ☐ Muddy ☐ Other: _____

Description: seep located in ditch downstream of the access road

Seep Spot Number 2

☐ Green Vegetation ☐ Wet or Muddy Ground ☐ Ponding Water ☐ Not Visible ☐ None Observed

☐ Flowing, Description: _____

Water Clarity: ☐ Clear ☐ Some particles ☐ Muddy ☐ Other: _____

Description: _____

Findings:

☐ a. The abutments/toe were not inspected.

☐ b. The abutments/toe appeared to be in satisfactory condition, no corrective actions are required at this time.

X c. The abutments/toe appeared to be in fair to poor condition and requires corrective action.

☐ d. The abutments/toe appeared to be in unsatisfactory condition and not expected to fulfill its intended function. Urgent corrective action is required.

Corrective Actions:

☐ e. Slope protection needs maintenance or repair. Description: _____

☐ f. Rut and/or Gully erosion was observed, which requires maintenance and/or repair. Description: _____

☐ g. A crack was observed along the abutments/near the toe, which requires further investigation to determine the underlining cause. Monitor the area and/or repair as required.

☐ h. The abutment/toe area was not visible due to high grass and bush vegetation. Clear high vegetation and maintain low to enable easy visual inspection.

☐ i. Tree(s) were observed along the abutment/toe. Trees have been identified as the probably cause of piping failures, and can possibly cause sever damage to the embankment if they are uprooted during a high winds. Corrective action is required to remove the tree hazards from the dam. Acceptable remedies include removal of the tree and its root structure down to a 2" diameter and reconstructing the damaged embankment section. All repair work shall be accomplished as per the requirements of licensed geotechnical or structural engineer. Routinely monitor the damaged area for signs of settlement and seepage.

☐ j. Seepage/Ponding water was observed. Monitor and conduct further investigation to locate the source of water and extent of any possible hazardous or developing condition.

☐ k. Seepage was observed flowing and particles were observed to be removed by the flow. Take immediate action to stop the loss of soil from the embankment. Conduct further investigation to determine the underlining cause and take corrective action. Monitor the area.

X l. Remove vegetation at toe and cut vegetation debris at the toe and in the toe ditch.

9. Outlet Works:

Culvert / Pipe

Type / Size: 12"

Culvert: ☐ Concrete ☐ Masonry ☐ unlined earth ☐ Other _____

Pipe: ☐ DIP ☐ Corrugated Metal ☐ PVC ☐ HDPE ☐ Concrete X Other steel

Control Type: ☐ Gate X Valve ☐ Other _____

Location: ☐ Control on Upstream side X Control on Downstream side

Seepage: ☐ Green Vegetation ☐ Wet or Muddy Ground ☐ Ponding Water X Not Visible ☐ None Observed

☐ Flowing, Description: _____

Water Clarity: ☐ Clear ☐ Some particles ☐ Muddy ☐ Other: _____

Description: _____

Findings:

☐ a. The outlet works were not inspected.

☐ b. The outlet works were not tested.

X c. The outlet works appeared to be in satisfactory condition, no corrective actions are required at this time.

☐ d. The outlet works appeared to be in fair to poor condition and requires corrective action.

☐ e. The outlet works appeared to be in unsatisfactory condition and not expected to fulfill its intended function. Urgent corrective action is required.

Corrective Actions:

☐ f. Seepage/Ponding water was observed. Conduct further investigation to locate the source of water and extent of any possible hazardous or developing condition.

☐ g. Seepage was observed flowing and particles were observed to be removed by the flow. Take immediate action to stop the loss of soil. Conduct further investigation to determine the underlining cause and take corrective action. Monitor the area. Failures caused by seepage/piping along the outlet conduit are very common and are considered to be a dangerous situation.

☐ h. Were not visible due to high grass and bush vegetation. Clear high vegetation and maintain low to enable easy visual inspection.

☐ i. Tree(s) were observed on the dam embankment. Trees have been identified as the probably cause of piping failures, and can possibly cause sever damage to the embankment if they are uprooted during a high winds. Corrective action is required to remove the tree hazards from the dam. Acceptable remedies include removal of the tree and its root structure down to a 2” diameter and reconstructing the damaged embankment section. All repair work shall be accomplished as per the requirements of licensed geotechnical or structural engineer. Routinely monitor the damaged area for signs of settlement and seepage.

☐ j. _____

10. Spillway:

Type: ☐ None ☐ Culvert/Pipe X Channel

Description: spillway and inlet ditch connected

Dimension: 3' wide ft. Invert elevation: ft. per staff gage

Slope Protection: X None ☐ Grass ☐ Dumped Rock ☐ Fitted Rip Rap ☐ Grouted Rip Rap ☐ Concrete

☐ Defect in Protection: Description:

Approach: ☐ Clear X High Veg. ☐ Trees X Other: ditch full of sediment and soil

Erosion: ☐ Scour ☐ Gully ☐ Headcut X Not Observed ☐ Other:

Description:

Vegetation: ☐ None ☐ Low Ground Cover X Bushes or Tall Grass X Trees # ☐ <6" ☐ >6" & <20" ☐ >20"

Description:

Findings:

☐ a. The Spillway appeared to be in satisfactory condition, no corrective actions are required at this time.

☐ b. The Spillway appeared to be in fair to poor condition and requires corrective action.

X c. The Spillway appeared to be in unsatisfactory condition and not expected to fulfill its intended function. Urgent corrective action is required.

Corrective Actions:

☐ d. Slope protection needs maintenance or repair. Description:

☐ e. The spillway approach was blocked. Clear approach.

☐ f. Severe scour erosion was observed which requires maintenance and/or repair.
Description:

☐ g. A headcut was observed downstream of the spillway. Corrective / mitigative action is required to prevent this problem from moving upstream.

X h. Trees are unacceptable in the spillway channel and approach. Take corrective action to address the woody vegetation problem and repair the damaged area.

☐ i. Unclear if spillway is adequately sized. Spillway should pass the probable maximum flood. Verify spillway capacity and take corrective action as required.

X j. Remove sediment and soil from the spillway. ***Urgent corrective action***

11. Down Stream Channel:

Name:

Downstream: ☐ Sump ☐ Open Area ☐ Un-Defined Drainage-way ☐ Defined Drainage-way X Other open field

Items along Stream Bank: ☐ None ☐ Road ☐ Houses ☐ Town ☐ Not Inspected

Description: ditch drained into open field

Findings:

☐ a. The downstream channel was not inspected.

☐ b. The downstream channel appeared to be in satisfactory condition, no corrective actions are required at this time.

☐ c. The downstream channel appeared to be in fair to poor condition and requires corrective action.

☐ d. The downstream channel appeared to be in unsatisfactory condition and not expected to fulfill its intended function. Urgent corrective action is required.

Corrective Actions:

☐ e.

Additional Comments:

FINDINGS:

Conclusion: On the date of this limited visual inspection, there appeared to be no immediate threat to the safety of the dam. No assurance can be made regarding the dam's condition after this date. Subsequent adverse weather and other factors may affect the dam's condition.

Urgent corrective actions:

1. Repair the broken 3" diameter PVC pipe owned by cooperative

2. Clear the spillway ditch of sediments and vegetation

Short-term recommendations:

1. Remove cut vegetation debris from the downstream toe and toe ditch.

2. Clear vegetation and trees from the crest

4. Long-term recommendations:

1. The upstream and downstream slopes and crest of the embankment should be clear and visible for inspection. Underbrush should be cleared and grasses kept short. Trees have been allowed to grow so large in some cases that there is concern that seepage along the root systems may develop. There is additional concern that cutting and killing the trees will lead to rotten roots and greater potential for seepage. A more in depth evaluation of the vegetation conditions should be performed to determine how best to remediate the condition.

2. A path or roadway along the groins, toe, and to the outlet works should be cleared and maintained to facilitate periodic inspection, maintenance, and monitoring of seepage conditions.

3. Ditches are located adjacent to the downstream toe along a majority of the embankment. Ditches in close proximity of the dam are generally discouraged. Adverse seepage conditions may develop in the ditch or on the side slopes. The ditches should be routinely cleared of vegetation so that routine inspections of the ditches for seepage or unstable slopes can be performed. Consideration should be given to relocating the ditches further away from the dam.

4. The downstream slope of the embankment is very steep (steeper than 1V:2H) and a ditch is located along the toe. The stability of the slopes should be further evaluated. If the factor of safety against sliding is less than the required factor of safety, flattening of the slopes or construction of a stability berm will be required.

5. A PVC water line is located on the downstream slope of the dam. The pipe should be relocated off of the embankment. Significant erosion of the embankment could occur if the pipe breaks. Today's inspection encountered a section of broken pipe and the water was spaying on the embankment.

Limitations and Intent of this Dam Safety Inspection:

This Dam Safety Inspection was conducted to assess the general overall condition of the reservoir/dam, identify visible deficiencies, and recommend areas of for monitoring, additional investigative studies and corrective actions. The inspection is based only on visible features/areas of the dam on the day of inspection. This inspection is not a formal phase I or phase II dam safety inspection and does not include a review or evaluation from each specialist of an inspection team, such as a geologists, civil, geotechnical, structural, or hydraulics engineer. The owner should verify the findings of this report and take corrective actions. The owner may submit to the State alternative corrective actions that are certified by a licensed professional engineer in the State of Hawaii experienced in the design and construction of dams. This inspection does not relieve the owner/operator from their responsibility to conduct routine inspections, maintenance, repairs, modifications, monitoring, documentation, and/or investigative studies. The inspection was conducted under the authority of the Hawaii Revised Statures Chapter 179D, and Hawaii Administrative Rules, Title 13, Chapter 190, titled “Dams and Reservoirs”. Questions regarding this inspection should be forwarded to the Hawaii State Dam Safety Program; PO Box 373; Honolulu, Hawaii 96809; Ph. (808) 587-0236.

View of the downstream slope of the dam. Note brush and trees on the slope.

View of the downstream slope of the dam. Note brush and trees on the slope.

View of upstream slope, reservoir, and outlet works intake structure.

View of the heavily vegetated crest.

Broken PVC pipe spraying water on the downstream slope of the dam. Pipe should be repaired immediately to prevent erosion of the embankment.